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## Introduction to Medical Writing

BY

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Three forms of medical writing are of special importance, because each may be written by any doctor—teacher, consultant or general practitioner. They are (1) the report of research; (2) the case report; and (3) the M.D. thesis. Experience shows that both papers and theses are hard to write, however able the writer may be from the professional or scientific point of view. It may therefore be helpful to discuss the different aims and structure of papers and theses and the best ways of tackling them. It should be easy to apply the general principles to other forms of medical writing, such as annotations and book reviews; although short, these are no less hard to write.

Writing a paper or thesis is the last stage of a research or study of some kind, and the value of the report will depend partly on the work itself, partly on the way it is presented. The writer must take into account what has already been published on his subject; to do this he must know how to use a medical library. He must also be careful not to draw wrong conclusions from his observations; here he will find it useful to know what sort of help can be had from the statistician. The final problem is how to set out the results in the most effective way; this involves a knowledge not only of English composition, but also of the possibilities of medical illustration, which can often help out the text enormously.

### PRESENTATION AND STYLE

Presentation means the general plan of the paper or thesis and all the devices used to make things as easy as possible for the reader. An important part of presentation is literary style—the choice and arrangement of words. Presentation cannot be thought of until one has decided who the reader is to be. There are many different kinds of medical reader—for example, consultants, research workers, general practitioners and (for theses) examiners—and the same approach will not serve for all. When planning a paper one must consider the circumstances, needs and interests of the reader. The various medical interests are represented by different kinds of journal, hence choosing the reader is in effect choosing the journal.

For the specialised writer—surgeon or pathologist, for instance—the choice of a journal for his paper is not difficult. He knows the leading journals in his field and the types of paper they want, for journals even in the same field have distinctive policies. These may be stated in editorial notices, but if not they can be deduced by examining a few recent issues. Whichever journal is chosen, the author should not write exclusively for other experts on his particular theme. After long and hard work on a problem one is apt to forget that most readers will have no special knowledge of it; the purpose, nature and meaning of the research should therefore be made as clear as possible. For work that is not highly specialised the best place is a weekly or other journal dealing with topics of common interest to different branches of the profession. If a paper is sent to the wrong journal the editor of that journal will commonly advise the author where to send it.

### CONSTRUCTION OF PAPERS

Some principles apply equally to scientific papers of all kinds. The various parts of a paper must be arranged in a logical sequence; they must also be of suitable length in relation to the whole, so that the finished work is a balanced or harmonious composition. This usually means giving most of the space to the sections on material, methods and observations; the introduction is relatively short and the discussion rather longer than the introduction. Disproportion is most likely to result from excessive length of either introduction or discussion. If the scientific work was well planned and executed there should be no need for a lengthy discussion, which may suggest that more or better work should have been done before the paper was written.

The size and construction of paragraphs also need attention. A paragraph should be a series of sentences developing, illustrating or reinforcing a single thought. The thought is given in the "topic sentence," which in scientific writing should be the first. When there is a distinct change of thought a new paragraph is needed. To avoid monotony, paragraphs should vary in length, but should not be too short; some authors make a paragraph of almost every sentence; this habit suggests that they are incapable of sustained thinking and irritates the reader. Sentences should be short, but not all of the same length; length can be varied by using the semicolon, a punctuation mark whose value is too little appreciated. The semicolon knits together

a group of related sentences within a paragraph (the fatiguing effect of unlinked sentences can be felt on reading any page of Macaulay). The shortest suitable word should be used—there is often a choice between long and short words.

There are many ways of antagonising readers. One is to depart from the serious and dignified tone proper to scientific writing; flippancy and slang instantly repel any reader of taste. So do mannerisms such as repeatedly starting sentences with “also.” An unusual word or turn of phrase may be used with effect once only; if it appears twice the reader’s hunting instinct is aroused, and he spends the rest of his time counting its later appearances, ignoring the subject of the paper. A scientific paper can be at once serious and engrossing; one should never try to whip up interest in journalistic fashion; interest should derive solely from the story itself told simply and modestly. The finer points of style are best learnt by comparing manuscript with proof; the proof of a well-written paper shows few editorial changes; what changes there are—even of punctuation marks—often produce striking improvements.

#### THE REPORT OF RESEARCH

The paper opens with one or two introductory paragraphs. These explain the object of the research and give enough information about previous work to enable the reader to see the paper in its historical setting. The most important earlier papers are mentioned, especially any recent ones giving reviews of the literature. If there is no recent review, the writer may give one. As a preliminary, he will have to compile a list of papers with the help of various indexes; these are to be found in every medical library. When compiling a list it is best to begin with the most recent papers, working backwards in time.

After the introduction comes a description of the material. The number of subjects—patients or experimental animals—should always be stated, since this determines the value of the results. Next follows an account of the methods used; if they are well known they are merely named, but any departure from standard practice should be described fully enough to allow other investigators to repeat the work. The results are then set out in the clearest way the writer can devise. It is usually best to give the results in words, but sometimes it is more convenient to give them in tables. It is useless to confront the reader with huge tables, because he will simply ignore them; on the other hand,

a small table consisting of a few rows and a few columns is always welcome. Sometimes results are best brought out by graphs; but if graphs are given one must also give tables, because it is impossible to tell from a graph what the figures were.

When the observations have been described the results of any statistical tests should be given. Standard techniques need only be named. The conclusions to be drawn from the tests should always be given in words for the benefit of non-mathematical readers; it is not enough merely to give the statistician’s hieroglyphics.

The last main section of a paper is the discussion. In this the author comments on his findings and shows their bearing on previous work. Alternative interpretations of the results are reviewed and conclusions are drawn. The paper ends with a summary. Often readers will read nothing but the title and the summary; the summary must therefore be an independent composition giving the main facts about the material, results and conclusions. It is no use merely saying what the paper is about—for example, that “variations in blood pressure have been studied”—a few figures must be given. The writing of informative summaries is difficult owing to the small space available; it needs even more care and thought than any other part of the paper. The summary is followed by acknowledgments of help (if substantial) and by the list of references; this includes all authors (and only those) mentioned in the paper.

Full use should be made of illustrations, which both save words and relieve the eye. They include diagrams, line drawings, paintings and photographs, all of which should be prepared by people with special training. There are two important rules for illustrations: first, an illustration must show clearly what it is said to show; second, one point or feature can be illustrated only once. Many different features can of course be shown in the same illustration—a good line drawing, for instance. A photograph from which a patient could be recognised should be published only with the consent of the patient, otherwise an action for damages is possible. Radiographs and photographs of tissue sections need choosing with special care, since they do not always reproduce well. Coloured illustrations of tissue sections are necessary only when the stain itself is to be illustrated; on the other hand, coloured reproductions of paintings of operation specimens are very helpful. Most journals find coloured illustrations too costly and may reproduce paintings in black and white.

## THE CASE REPORT

Case reports vary much in size and scope. When brief, they may be published in a general journal as medical memoranda or letters to the editor; at the other end of the scale is the elaborate study filling several pages of a specialist journal. Usually only one case is described, but sometimes there are two or three. A case needs reporting when some feature of it is rare or important for the diagnosis or treatment of disease; it may also be usefully reported as a reminder of a neglected syndrome. The experienced doctor should not find it hard to decide whether a case ought to be reported, but if in doubt he can always get advice. Too few cases are being reported at present and much useful information is being lost to the profession as a result. This failure to publish is probably due mainly to lack of time for writing; to some extent it may be due to a lessened interest in clinical observation on the part of medical journals.

The length of a report will depend on the interest and complexity of the case, and the reporter should adapt the general rules for paper-writing to the scale he decides to work on. The case report is one of the most flexible forms of medical writing, and the reporter is free to tell his story in the way that seems to him most effective. Obviously there should be a logical order of topics, such as: introduction, clinical history, investigations, operation, postoperative course and commentary. A brief report need not refer to the literature, especially if the point of the case will be obvious to any practitioner in the branch of medicine concerned.

## PREPARING THE MANUSCRIPT

A finished paper should be set aside for a few days at least. On coming back to it the author will probably change the wording here and there. When the text has become stabilised the paper should be typed and copies should be given to one or two colleagues for criticism. Colleagues can spot mistakes in the work itself and also obscurity or other faults in presentation; all such defects should be remedied before the manuscript is sent to a journal. There are two sorts of requirement to be fulfilled: those applying to all manuscripts and those peculiar to the journal chosen.

The final copy of a manuscript should be typed on stiff quarto sheets (10 in. by 8 in.) and each sheet should be numbered. The whole paper, including the references, should be in

double-spaced type. The left-hand margin should be  $1\frac{1}{2}$  inches wide, to leave room for instructions to the printer and editorial changes. The need for such a wide margin should be explained to the typist. The first page of a manuscript should bear only the title of the paper and the author's name, qualifications and appointment; instead of appointment, some authors name the place where the work was done or the town where they practise. Below these details the author's full postal address should be written in ink (not typed) so that the editor or printer can communicate with the author without delay. The text of the paper starts on the second sheet, the suggested place of insertion of tables or illustrations being marked (in ink) in the left-hand margin. Each table should have a sheet to itself; tables should not be inserted in the text, but should all be placed together after the references. After the tables comes a sheet bearing the descriptions of any illustrations.

Photographs should be sent in the form of unmounted glossy prints. They should be numbered and bear the author's name and the title of the paper. To avoid damage to the print by pressure of pen or pencil, these details should be written on a slip of paper, afterwards stuck on the back of the print. No marks should be made on the photograph; any necessary marks should be indicated on a superimposed transparent paper. Prints should not be fastened together with clips or pins, which may cause irreparable damage.

Besides these rules, those of the individual journal should be followed in such matters as the style of the headings and the form of the references. Instructions to contributors are often printed in each number of a journal, and a few journals issue pamphlets giving detailed advice; in the absence of any guidance, the author should follow the style of recent numbers of the journal. Only the top copy of a manuscript should be sent to a journal; to send a carbon copy is a rude and thoughtless gesture; moreover, it suggests that the top copy has gone to another journal or been worn out in journeys to and from editorial offices. It is always understood that a paper is offered to one journal only; once published, a paper may not be reproduced elsewhere without the permission of both editor and author. A manuscript should be accompanied by a letter (one page) explaining the nature, scope and significance of the work; the editor can then see at once whether the paper merits close examination.

Proof should be compared word for word with the manuscript. Three readings are advisable, since a writer is apt to see what he thinks should be there, which is not always what has been printed. Editorial changes should always be accepted unless the author's meaning has been changed materially. Additions and deletions at the proof stage are equally undesirable owing to their high cost.

#### THE M.D. THESIS

The writer of an M.D. thesis is like a horse going through his paces—in other words, the thesis is a demonstration of capacity. The judge of this is not the reader of a periodical, who wants information only, but an examiner assessing the candidate's prowess and looking out for faults. Since a paper and a thesis differ in aim, they also differ in structure.

A good thesis may need from 50 to 100 quarto pages of double-spaced typing; it is therefore much longer than a paper. The greater length is due to the need for much fuller treatment of the various aspects of the subject. There is a detailed review of the literature; this may fill many pages, as compared with the one or two opening paragraphs of a paper. The review of the literature serves as the historical background to the candidate's observations, which must be seen to arise from it. The material and methods are set out more fully than in a paper; and where there are alternative approaches to the problem, the author must justify his choice. He must also show that he paid due regard to possible sources of error. The results are often bulky; to avoid breaking the thread of the story, the text should contain only one typical example of each group of observations or experiments, all duplicate or parallel observations being put in an appendix at the end of the thesis. The discussion is also fuller than it would be in a paper, and the implications of the results for future work should be stated clearly. The thesis ends with a detailed summary (a few pages).

A thesis is best written like a book, each of the main sections—introduction, results and discussion—being divided into chapters. A concise preface (two pages) should say why the work was done and give the main results and conclusions. The preface may end with thanks for help and facilities. Each university has its own rules for the typing and binding of theses, and the candidate should study any published or private instructions. He should also look at

some theses already accepted for the M.D. of his university. An M.D. candidate may be allowed to submit published work instead of a thesis; if he does this, he should also submit a typed memorandum (30-50 pages) giving a connected account of the whole of the work and clearly explaining the relation of the various papers to each other.

It is unwise to start thesis work before visiting the professor in whose field the work would lie. The professor can assess the candidate's general fitness for thesis work and the suitability of the problem; if satisfied on both points, he will give much valuable advice. The essential requirement for the M.D. is good work well presented; good work badly presented may be accepted after re-writing, but poor work will never pass, however well presented.

#### SUMMARY

An article is most effective when addressed to a particular kind of reader, though not written exclusively for the expert. Short sentences and short words make for easy reading, and words can be saved by using tables and illustrations. Special care should be devoted to the composition of the summary—the only part of a paper many people read.

The manuscript should be prepared in the form prescribed by the journal. It should be in double-spaced type throughout on stiff quarto sheets (10 in. by 8 in.) and the top copy should be submitted. It must be offered to one journal only, and once published it may not be reproduced elsewhere without permission.

The M.D. thesis, being a demonstration of capacity, is much more detailed and therefore longer than any article. Each university has its own special requirements, and thesis work should be undertaken only with the approval of the professor most closely concerned.

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